

Financial Econometrics

Problem Set

Problem set 2, 2021

Exercise 1. *The Value of a Win in the Premier League* [5]

The link between soccer results and stock market performance - Manchester United.

Consider a football club as a business concern. Its main sources of revenues are ticket sales at home games, as well as TV revenues etc. These revenues are presumably increasing in the position in the league, as more fans are interested in going to the games, as well as the likelihood of TV coverage. Each time the club wins a game, it increases the likelihood of higher future income, an increase that should be reflected in the *current economic value* of the football club. If the football club was a listed company, we would expect to see an increase in the stock price the day after a win.

Well, there are actually listed football clubs. Manchester United is listed on the New York Stock Exchange. We can use stock price data for Manchester United to ask the question: How much is a win(or loss) worth?

How to ask this? Well, we need to identify the stock return that reflects the result of a given game. Suppose games are played on Saturday. We would therefore expect to see the reaction in the stock price on the following monday. So if we collect the stock returns for Manchester United, look at returns on the day after a game, we should see that days following a win are days when returns are higher than days when they lose.

You are asked to check this. On the homepage you will find data on the UK premier league results. Manchester United shares are traded in the US.

1. Collect returns for Manchester United, and split it into three cases:

- Wins
- Draw
- Loss

Are the returns different? In expected directions?

2. An alternative way to investigate this relationships in terms of *points*. For each game, a team gets 3 points for a win, 1 for a draw, and 0 for a loss. What is the increase in value from a one point increase?

This can be done as a regression:

$$r_{it} = a + b\text{points}_{it} + e_{it}$$

What is the predicted sign on b ? What do you find?

3. Manchester United has recently been coached by a Norwegian. Are the above relationships different during Solskjær's reign?

The data for this exercise runs until first week of September, 2021.

Exercise 2. *Five factor* [8]

Fama and French has recently introduced their five-factor model, which leads to the regression:

$$eR_{i,t} = b^m eR_{m,t} + b^{SMB} SMB_t + b^{HML} HML_t + b^{RMW} RMW_t + b^{CMW} CMW_t + \varepsilon_{i,t}$$

You want to test whether the two “new” factors RMW and CMW makes much of a difference.

Your test assets are monthly returns for 10 US Industry portfolios, provided by Ken French, with data from 1926 to 2015. Use the equally weighted portfolios.

Perform a “Black Jensen Scholes” type of analysis.

- One analysis should be looking at adding the last two factors to the three factor model. How much does this improve the estimations.
- Another should be to look at momentum. It has been argued that the five factor model makes momentum unnecessary. Investigate that by looking at adding momentum to the three factor and five factor models.

Exercise 3. *Exposure* [5]

The concept of exchange rate exposure can be both applied to companies and to whole exchanges. Exchange rate exposure occurs when changes in exchange rates affect the value of a firm/exchange. To measure the degree of exposure one will want to find the coefficient b in the following relation

$$\Delta \text{ Value} = a + b\Delta\text{Exchange Rate}$$

To empirically investigate exposure, one will typically run regressions

$$R_{it} = a_i + \text{Other factors} + \beta_{ix}X_t + e_{it}$$

where R_{it} is the return on the asset which we want to measure exposure to, a_i is a constant, X_{it} the (change in) the exchange rate, and β_{ix} is the exposure measure.

You want to see if there are signs that currency risk affects the US stock market. To this end collect the returns on the Fama French 17 industry portfolios. Similarly collect monthly changes in the JPY and EUR. Using data 1990-2017 for the JPY, and for the EUR 2000-2017, investigate how many of the industries show sign of exchange rate exposure. In the specification of the “other factors,” use both a single market index (CAPM) and the Fama French 3 factor model.